Retinal Vein Occlusion following Cataract Surgery: A Report of Five Cases

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Abstract
This article describes five cases of central retinal vein occlusion (CRVO) occurring shortly after uncomplicated cataract surgery in patients without known risk factors. All patients developed significant visual loss within one month postoperatively, with clinical and imaging findings consistent with CRVO, and were successfully treated with intravitreal anti-VEGF and corticosteroid injections.
No clear underlying cause was identified, suggesting a possible association between cataract surgery and CRVO. The authors propose that intraoperative increases in intraocular pressure may have led to venous compression and stasis, promoting thrombus formation in susceptible retinal vessels.
Although RVO is not a recognized complication of cataract surgery, the short time interval observed in these cases raises the possibility of a causal relationship.

Keywords:
Retinal vein occlusion , phacoemulsification , cataracte surgery .

Introduction

Retinal vein occlusion (RVO), which includes central retinal vein occlusion (CRVO) and branch retinal vein occlusion (BRVO), is the second most common retinal vascular disorder and one of the most vision-threatening conditions.
Numerous studies have analyzed the risk factors associated with this condition. These include hypertension, elevated intraocular pressure (IOP), chronic open-angle glaucoma, and hyperopia. We report five cases of RVO occurring after uncomplicated cataract surgery.

Clinical Case :

This involves five patients aged between 48 and 73 years, with no significant medical history, particularly no history of hypertension, glaucoma, or ocular hypertension. They were admitted to the ophthalmology department for cataract surgery by phacoemulsification.
The surgery was uneventful in all five cases, with no intraoperative complications, in particular no capsular rupture, although the operative time was slightly prolonged (approximately 40 minutes). On postoperative examination, within less than one month, visual acuity was below 3/10. Fundus examination revealed flame-shaped hemorrhages in all four quadrants associated with macular edema, suggestive of central retinal vein occlusion (CRVO) (Figures 1, 2). Fluorescein angiography showed no signs of ischemia.The patients received intravitreal injections (IVT) of anti-VEGF agents and corticosteroids, with good clinical improvement. The same clinical presentation was observed in all five patients. An etiological workup was performed but did not reveal any obvious cause. The very short interval between cataract surgery and the onset of CRVO suggests a possible association between the two events.

Discussion

Retinal vein occlusion is the second most common retinal vascular disease after diabetic retinopathy [1]. Central retinal vein occlusion (CRVO) has been associated with several risk factors, including hypertension, hyperlipidemia, increased body mass index, thrombophilic disorders, hyperviscosity, certain systemic diseases, renal dysfunction, some medications, and various ocular conditions [2].

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Regarding thrombophilic risk factors, it has been difficult to determine the extent to which thrombophilia plays a role in RVO. Some studies support, while others refute, the role of hyperhomocysteinemia and anticardiolipin antibodies in the development of branch retinal vein occlusion (BRVO) [3], [4].

Retinal vein occlusion may also occur as a complication of local or systemic vasculitis, whether infectious or non-infectious, or from direct ocular infiltration leading to venous obstruction in conditions such as sarcoidosis, ocular tuberculosis, or neoplastic diseases, such as non-Hodgkin lymphoma.

Dehydration may act as a triggering factor in individuals predisposed to the development of RVO.

Other risk factors, particularly ophthalmological ones such as glaucoma and elevated intraocular pressure, may predispose to RVO due to increased ocular pressure leading to venous stasis in blood flow [3].

Central retinal vein occlusion (CRVO) most commonly occurs at an arteriovenous crossing, where the artery and vein share a common adventitial sheath. It has been shown that in nearly all cases of RVO, the artery lies anterior to the vein at the site of occlusion, suggesting that arterial abnormalities may play a role in the development of this condition. Indeed, at the crossing site, narrowing of the vein—compressed by the relatively thick-walled artery—may cause hemodynamic disturbances. These, in turn, may lead to endothelial damage and thrombus formation [5]. However, RVO may also occur without obvious venous narrowing at arteriovenous crossings. Jefferies, Clemett, and Day observed that at crossings where the vein abruptly changes direction to pass beneath the artery, there is focal thickening of the venous basement membrane, a phenomenon that may result in endothelial injury at the venous level [6].

More recently, another pathogenic mechanism has been suggested as a possible cause of venous occlusion. Atherosclerotic arteries may produce increased amounts of endothelin-1, a substance that diffuses into the adjacent vein and induces venous vasoconstriction [7].

In our case, cataract surgery appears to be the most likely triggering factor for retinal vein occlusion (RVO). Vasavada et al. demonstrated that intraocular pressure can reach 85 mmHg during aspiration of nuclear fragments, whereas the perfusion pressure of the retinal artery is approximately 60 mmHg. Similarly, Zhao et al. reported peaks of up to 96 mmHg during cortical cleaning and removal of viscoelastic substances.

Thus, the marked increase in intraocular pressure during surgery may have compressed the retinal vein and induced venous stasis, particularly given the relatively prolonged operative time. This situation may have favored thrombus formation in a vessel already weakened by pre-existing endothelial alterations [8], [9].

Conclusion

Approximately 10 million cataract surgeries are performed worldwide each year, and to our knowledge, retinal vein occlusion is not classically reported as a complication of this procedure. However, it should be kept in mind that cases of RVO may occur after cataract surgery, and the short interval between the procedure and the onset of retinal vein occlusion in these cases may suggest a possible relationship between the two events.

Declarations

Ethics approval and consent to participate

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of this review.

Consent for publication

All authors consent to publication

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understand that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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List of figures:

Figure 1: Fundus images of three patients who underwent cataract surgery, showing central retinal vein occlusion (CRVO).

Figure 2: Macular optical coherence tomography (OCT) images of three patients, demonstrating marked macular edema in the context of CRVO occurring after cataract surgery.

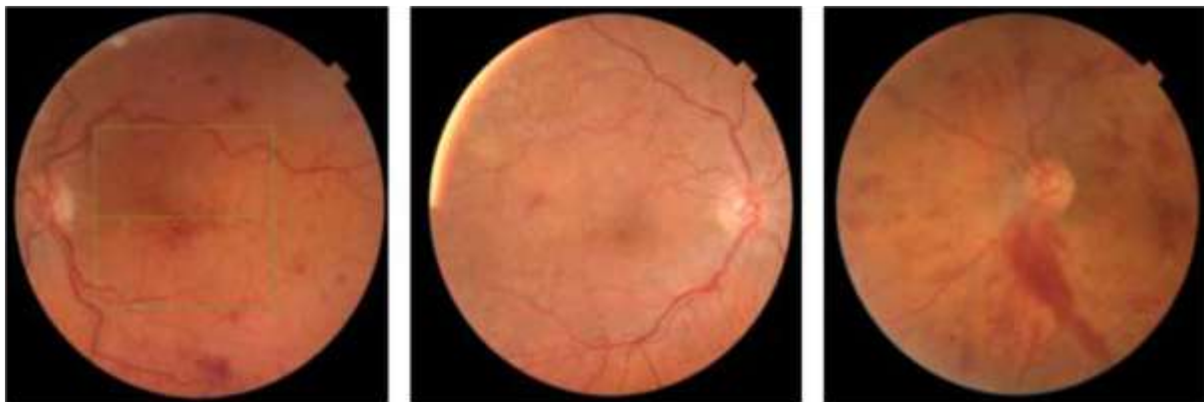

Figure 1.

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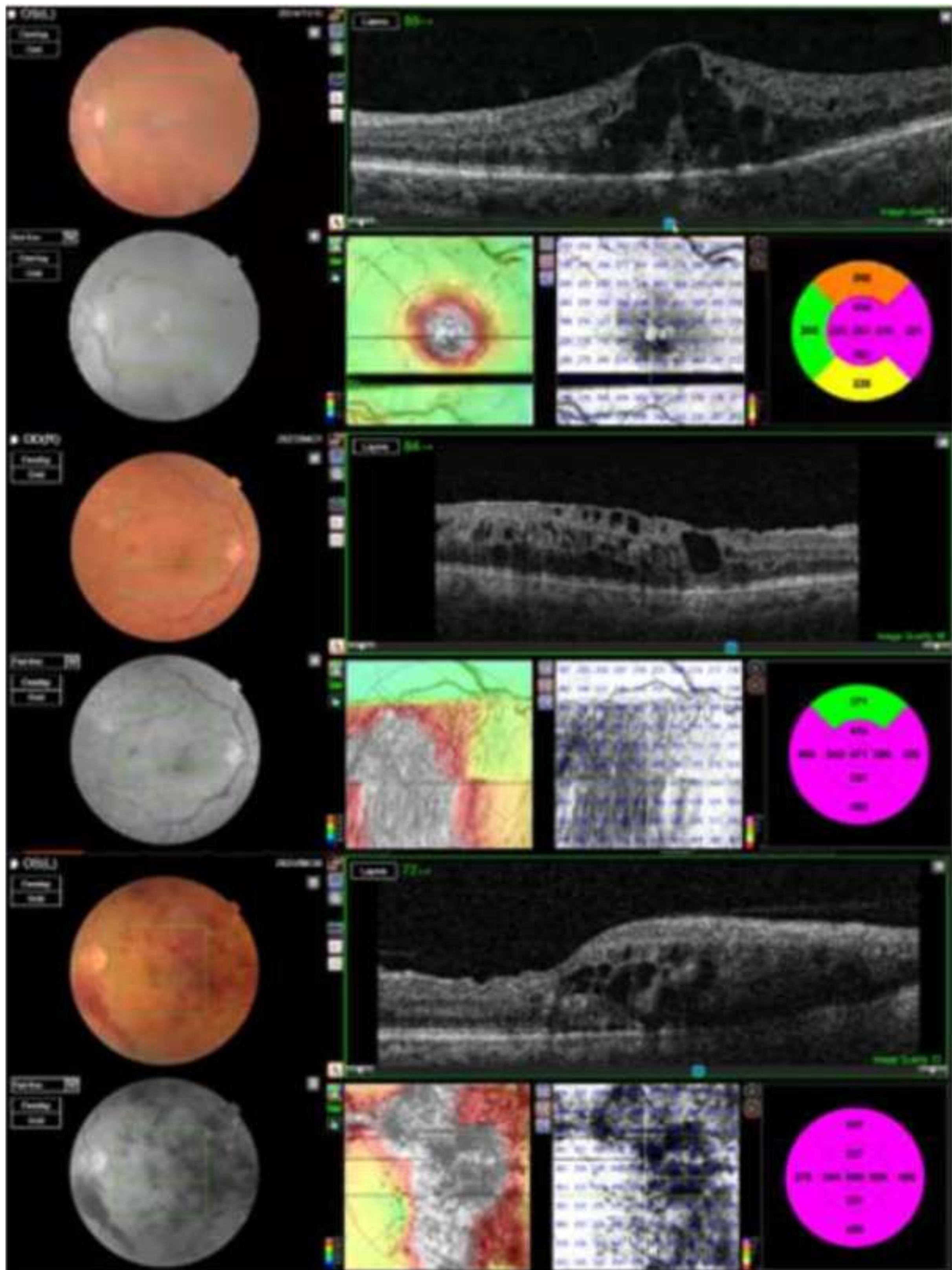

Figure 2.

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